**NASA SPACE APP CHALLENGE**

**SRI RAMAKRISHNA ENGINEERING COLLEGE**

TEAM MEMBERS:

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**REQUIREMENTS**

~ [Python 3](https://www.python.org/downloads/" \t "https://medium.com/@spidey.sandy/_blank)

~ numpy

**PROJECT IDEA:**

In outer space everything will be dark except debris . If we can exclude the things in black from footage, the remaining will be debris.So create a boundary range for black colour

lowerBound=np.array([0,0,0])  
upperBound=np.array([0,0,255])

Import the footage and then create two kernels for opening and closing

cam= cv2.VideoCapture("debris.mp4")  
kernelOpen=np.ones((5,5))  
kernelClose=np.ones((20,20))

Next in a looping manner, extract each frame from footage , resize it convert it into HSV from BGR , because it easier to operate on that regarding colours .

ret, img=cam.read()   
img=cv2.resize(img,(1366,768)) #convert BGR to HSV   
imgHSV= cv2.cvtColor(img,cv2.COLOR\_BGR2HSV)

Create a mask with lower bound and upper bound, with that created a mask, open that by passing the created mask with kernel open. Close it with kernel.

# create the Mask   
mask=cv2.inRange(imgHSV,lowerBound,upperBound) #morphology maskOpen=cv2.morphologyEx(mask,cv2.MORPH\_OPEN,kernelOpen) maskClose=cv2.morphologyEx(maskOpen,cv2.MORPH\_CLOSE,kernelClose)

Next find contours(outline of objects) by using chain-approx-none algorithm.

im,conts,h=cv2.findContours(maskClose.copy(),cv2.RETR\_EXTERNAL,cv2.CHAIN\_APPROX\_NONE)#Draw around that contours with white line   
cv2.drawContours(img,conts,-1,(255,0,0),3)

And then its a matter of drawing a simple bounding rectangle around the debris and show it to display.

for i in range(len(conts)):

x,y,w,h=cv2.boundingRect(conts[i])   
cv2.rectangle(img,(x,y),(x+w,y+h),(0,0,255), 2)  
cv2.putText(img, str(i+1),(x,y+h),font,1,(0,255,255))